

# HOWTOONS

# Das Sub

MATERIALS:

2 PLASTIC  
WATER  
BOTTLES

SCISSORS

NEEDLE  
NOSE  
PLIERS

2 PAPER  
CLIPS

REDUCE  
FRICTION  
FOR THE DRIVE  
TRAIN

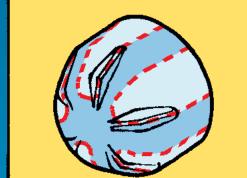
USE A SPACER  
BETWEEN THE  
PROP AND THE  
CAP. TRY BEADS,  
ROUNDED CAPS,  
OR BEARINGS.



MAKING THE PROPELLER:



CRUSH. THEN  
CUT A BOTTLE  
IN HALF.

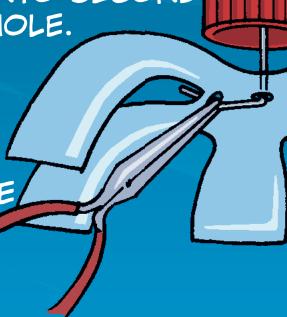


TRIM AROUND  
THE BOTTOM.

CUT THRU THE MIDDLE  
OF EACH HIGH  
AND LOW POINT.

DRILL  
HOLE IN  
BOTTLE  
CAP

STRAIGHTEN  
PAPER CLIP, AND  
FEED THROUGH  
BOTTLE CAP THEN  
THRU PROPELLER  
CENTER HOLE.  
BEND A HOOK  
INTO SECOND  
HOLE.



EXPERIMENT  
WITH  
DIFFERENT  
SIZE  
SUBS.

DRILL A HOLE IN  
THE BOTTOM OF  
YOUR BOTTLE. USING  
CHOPSTICKS FEED A  
PAPERCLIP THRU.

USE CHOPSTICKS  
TO HOOK  
RUBBER  
BAND.

CONNECT  
STABILIZER FINS  
WITH TWO RUBBER  
BANDS.

WITHOUT FINS, PROP  
AND BOTTLE BOTH SPIN  
IN OPPOSITE DIRECTIONS



HOOK  
PAPERCLIP  
INTO  
SECOND  
HOLE.

B  
U  
O  
Y  
A  
N  
C  
Y

WITH MORE OR  
MOSTLY AIR INSIDE,  
THE SUB HAS  
POSITIVE BUOYANCY  
AND WILL RISE  
UNDER WATER OR  
FLOAT ON TOP.

BUOYANCY  
AND  
AND WILL STAY  
LEVEL UNDER  
WATER

WITH LITTLE OR NO  
AIR INSIDE, THE SUB  
HAS NEGATIVE  
BUOYANCY AND  
WILL SINK UNDER  
WATER.

NEGATIVE

WITH STABILIZING FINS,  
PROP SPINS, BOTTLE  
MOVES FORWARD.

NOTHING  
HUNGRY I  
HOPE.

ZE' END!

JOOST, SAUL, AND NICK! HOWTOONS.COM